IN THE CLAIMS:

Claim 1 (currently amended): A heat emitting probe comprising:

a conductive carbon nanotube probe needle with a base end portion thereof fastened to a holder and a tip end portion thereof protruding,

a heat emitting body provided on a circumferential surface of said conductive carbon nanotube probe needle, and

a conductive carbon nanotube lead wire fastened to said heat emitting body.

Claim 2 (currently amended): A heat emitting probe comprising:

a conductive carbon nanotube probe needle with a base end portion thereof fastened to a holder and a tip end portion thereof protruding,

a heat emitting body provided on a circumferential surface of said conductive carbon nanotube probe needle,

a conductive carbon nanotube lead wire fastened to said heat emitting body, and

a means for causing an electric current to pass through both ends of said conductive carbon nanotube lead wire and said conductive carbon nanotube probe needle, wherein

an electric current is caused to pass through said heat emitting body.

Claim 3 (currently amended): The heat emitting probe according to Claim 2, wherein:

an atomic force microscope (AFM) cantilever in which a protruding portion used as said holder is formed on a cantilever portion thereof is employed,

two electrode films are provided on said cantilever portion,

one end of said conductive carbon nanotube lead wire is connected to one of said electrode films, and

said conductive carbon nanotube probe needle is connected to another of said electrode films, wherein

said electric current is caused to pass between said electrode films.

Claim 4 (currently amended): The heat emitting probe according to Claim 2, wherein:

an atomic force microscope (AFM) cantilever in which a protruding portion used as said holder is formed on a cantilever portion thereof is employed,

two electrode films are provided on said cantilever portion,

one end of said conductive carbon nanotube lead wire is connected to one of said electrode films, and

said conductive carbon nanotube probe needle and another of said electrode films are connected by means of another conductive nanotube lead wire, wherein

said electric current is caused to pass between said electrode films.

Claim 5 (currently amended): A heat emitting probe apparatus comprising:

said heat emitting probe according to Claim 2, 3 or 4,

a scanning mechanism that allows a tip end of said conductive carbon nanotube probe needle of said heat emitting probe to scan over a sample, and

a control circuit which passes an electric current through said tip end of said conductive carbon nanotube probe needle, wherein

said tip end of said conductive carbon nanotube probe needle scans a surface of a sample.

Claim 6 (currently amended): The heat emitting probe apparatus according to Claim 5, wherein

said sample is a thermal recording medium, and

said tip end of said conductive carbon nanotube probe needle is heated by said heat emitting probe, and wherein

information is recorded by means of a hole pattern formed in a surface of said thermal recording medium.

Claim 7 (original): The heat emitting probe apparatus according to Claim 5, wherein said tip end of said conductive probe needle scans over said sample surface while being heated by said heat emitting probe, thus detecting thermal conductivity distribution of said surface of said sample by means of variations in an amount of radiant heat from said heat emitting body or variations in resistance of said heat emitting body.

Claim 8 (currently amended): The heat emitting probe apparatus according to Claim 5, wherein said surface of said sample is scanned by said tip end of said conductive carbon nanotube probe needle using said heat emitting probe, thus detecting temperature distributions of said surface of said sample as variations in resistance of said heat emitting body.